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ABSTRACT

This training manual, which was developed for employees of an automotive plant, is designed to teach trainees to operate a portable weld tester (Miyachi MM-315). In chapter 1, the weld tester's components are illustrated and described, and the procedure for charging its batteries is explained. Chapter 2 illustrates the weld tester's parts, specifies their functions, and explains the different pieces of information indicated on the tester's liquid crystal display. The following items are discussed in chapter 3: weld tester assembly, cable positioning, toroidal cable parts and functions, toroidal coil, toroidal connector, toroidal coil setup, and coil fastening. Chapter 4, which details the individuals steps in the weld tester's operation, describes the following procedures: use the 50 Hz/60 Hz switch to set the weld tester's frequency to that of the welder being tested; determine the weld tester's present setting; use the weld tester's range switch; determine the weld tester's present range setting; use the impulse switch to set the tester to the welder impulse being measured; determine the weld tester impulse number setting; use the first cycle switch to set the tester to the welder first cycle being measured; and determine the weld tester first cycle number setting. (MN)

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Portable Weld Tester

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HONDA OF AMERICA MANUFACTURING INCORPORATED

Portable Weld Tester

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Introduction

This training manual was written with the objective that given a weld tester and welder, the trainee will be able to measure welder cycles, current, and degrees of conduction and report the measured value.

The trainees will be given a weld tester and a welder and asked to:

Assemble the weld tester in the proper configuration.

Position the weld tester in the proper location.

Operate the weld tester in the safe and correct manner, measuring the current, cycles, and conduction degrees of the welder.

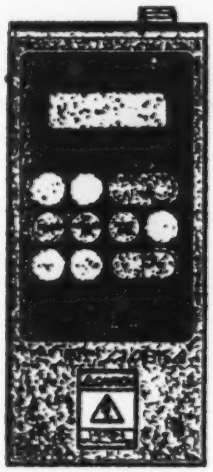
Chapter 1

Component Identification

A portable, multiple function monitor for resistance spot welders.

The Weld Tester consists of two parts: 1) Weld Tester; 2) Toroidal Coil. The Weld Tester and the Toroidal Coil are used to measure weld current, weld cycles, and conduction degrees

Toroidal Coil



Weld Tester

Charging

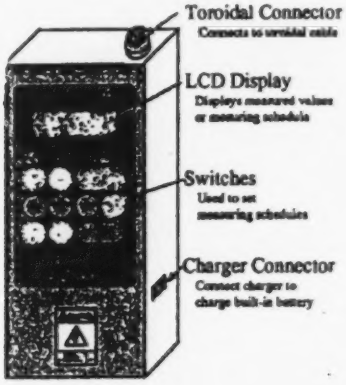
To charge the batteries in the unit, a charger is provided, and protection for the unit is provided by a leather case.

Chapter 2

Weld Tester Parts and Functions

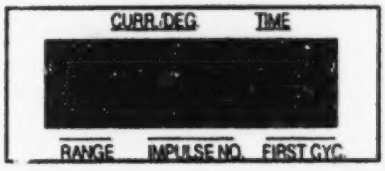
Minimal parts, simplified functions.

The Weld Tester is a hand-held measuring device used to analyze and display equipment weld current, weld cycles, and conduction degrees. The Weld Tester uses four rechargeable nickel-cadmium batteries. The Weld Tester interprets the current, cycles, and conduction degrees sensed by the equipment being analyzed.



LCD Display

The LCD displays the Weld Tester settings, the measured values, and the measuring schedule.



Once you have removed the weld tester and cable from the leather case, you can set up the weld tester so the welder readings can be reported. To do this, you must:

- **Assemble the weld tester.**

- Properly position the cable on the welder.
- Operate the weld tester.

Chapter 3

Assembly and Set-up.

Weld Tester Assembly

Proper weld tester assembly is critical to safety and the operation of the weld tester and the welder. Mount the toroidal coil onto the weld tester as shown and described below.

Cable positioning

The toroidal cable should be looped onto the welder. Most welders have two locations where the weld tester cable can be placed, on near each of the electrodes. Loop the toroidal cable around the weld arm as shown.

Toroidal Cable Parts and Functions

The Weld Tester toroidal cable is ten feet long. The cable coil senses the current, cycles, and conduction degrees of the equipment being analyzed. The coil then passes this information to the Weld Tester via the cable and connector.

Toroidal Coil

The toroidal coil is located on the length of 3/8" cable supplied with the Weld Tester. The cable contains a flexible black coil with velcro tape on one end, and a chrome connector on the other end of the cable. The chrome toroidal coil cable connector has a single white guide slot.. Use the white slot as a guide when connecting the cable to the toroidal connector located on the top of the Weld Tester. The toroidal coil cable attaches to the Weld Tester at the toroidal connector.

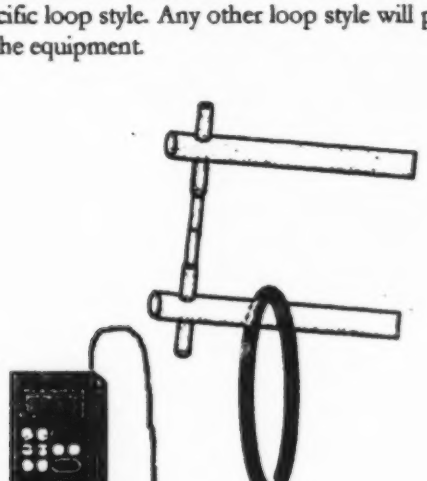
Toroidal Connector

The toroidal connector is located on top of the Weld Tester. The connector is used to connect the toroidal coil to the Weld Tester. A red "v" is located on the connector for aligning the toroidal coil cable connector.

To attach the toroidal coil to the toroidal connector, grasp the toroidal coil cable connector, and align the white mark with the red "v" on the toroidal connector. Push the connectors together. Tighten the connector.

Toroidal Coil Set-up

The acceptable methods for toroidal cable set-up is with the center of the coil on the secondary current arm of the welder. The Weld Tester and toroidal cable are calibrated for one specific loop style. Any other loop style will produce false readings, and possibly damage the equipment.



Coil Fastening

The proper method for fastening the toroidal coil is to place the ends of the coil aligned and parallel to each other, without any part of the coil crossing any other part of the coil. The loop that is formed will be placed around the welder arm. The toroidal coil must be fastened as shown above.

Do not fasten the coil in any other manner. Do not: 1) cross the coil; 2) fasten with tape; 3) or create an overlapped loop.

The following illustrate unacceptable loop fastening.

1
2
3

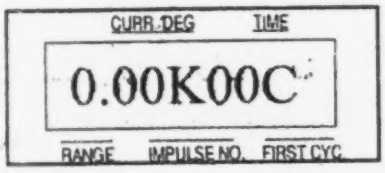
Chapter 4

Weld Test Operation.

Step-by-Step Operation

The following is the step-by-step procedure for the operation of the weld tester:

- Turn on the unit by depressing the ON switch once.
- After pushing the ON button once, the unit will immediately produce a single beep sound, and briefly display a set of numbers on the LCD panel. The numbers displayed will be the present weld tester settings for hertz and current type. The tester can be set to measure either AC or DC current, and either 50 Hz or 60 Hz. The display will be the current setup configuration, such as [60 Hz AC] or [50 Hz AC] or [60 Hz DC] or [50 Hz DC].
- After this brief hertz and current type display appears, the unit will display the default setting of [0.00K00C].



To determine the units default settings, or the settings stored in the unit since its last use, depress each of the Weld Tester switches.

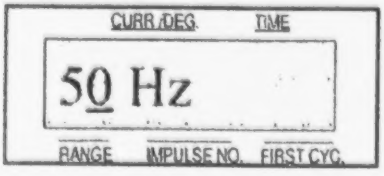
50 Hz/ 60 Hz

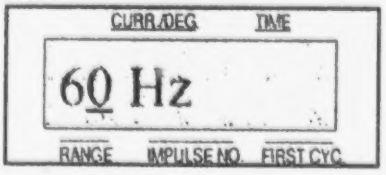
The 50 Hz/ 60 Hz switch is used to set the hertz of the Weld Tester to the Hertz of the welder being tested. Typically this is also the hertz of the voltage supplied to the manufacturing plant. Refer to the weld unit being tested to determine the welder's hertz specification. Once the welder hertz is determined, set the Weld Tester to the specified hertz. The weld tester allows the user to select two settings for hertz. A hertz setting of 60 Hz is typically required for testing being conducted in North America. A hertz setting of 50 Hz would be for testing welders in Europe and Japan. North America uses a 60 Hz setting, Europe and Japan use a 50 Hz setting.

50 Hz/ 60 Hz Setting

To determine the Weld Tester 50 Hz/ 60 Hz setting, depress the 50 Hz/ 60 Hz switch once. The left side of the LCD display will read either 60 Hz or 50 Hz. A display of 50 Hz identifies the Weld Tester as being set to European and Japan hertz, a display of 60 Hz identifies the Weld Tester as being set to the North American hertz.

To set the hertz, depress the 50 Hz/ 60 Hz switch once. The left side of the LCD display will read either 60 Hz or 50 Hz. To change the setting, depress the [-] key to set the Weld Tester to the [50 Hz] range, or depress the [+] key to set the Weld Tester to the [60 Hz] range.





Range

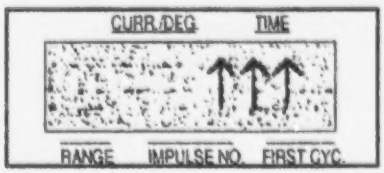
The range switch is used to set the KA being measured. Refer to the weld unit being tested to determine the welder's KA output specification. Once the welder KA is determined, set the Weld Tester to the specified Range. The weld tester allows the user to select two ranges for KA measuring. A KA setting from 0-9.99 KA is requires a low [Lo] range setting. A KA setting of 5-49.9 KA is requires a high [Hi] range setting.

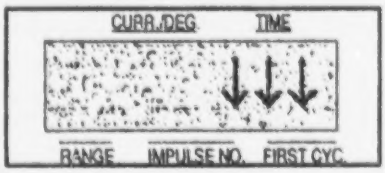
The Weld Tester duplicates the ability to measure from 5-9.9 KA (a 4.99 KA range) between the Hi and Lo setting. The intentional overlap from 5 KA to 9.99 KA allows the most common welder outputs to be read on the Weld Tester without changing the Range setting.

Range Setting

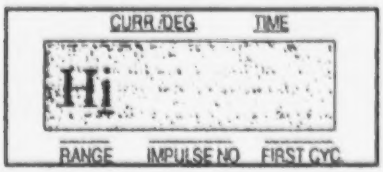
To determine the Weld Tester range setting, depress the RANGE switch once. The left side of the LCD display will read either [Hi] or [Lo]. A display of [Hi] identifies the Weld Tester as being set to the high range of 5-49.9 KA. A display of [Lo] identifies the Weld Tester as being set to the low range of 0-9.99 KA.

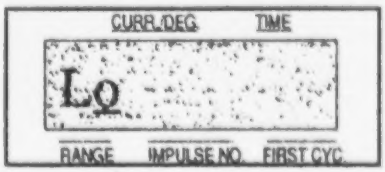
The LCD may also show a set of arrows. If the LCD also displays a set of three up-arrows [↑↑↑], or three down-arrows [↓↓↓], then the range setting is improper for the welder being measured, and the range needs to be re-set. Three up-arrows [↑↑↑] mean that the Weld Tester's range needs to be raised to the [Hi] range. Three down-arrows [↓↓↓] mean that the Weld Tester is set too high, and the range needs to be lowered to the [Lo] range. If no arrows are displayed, then the setting is proper.





To set the Range, depress the RANGE switch once. The left side of the LCD display will read either [Hi] or [Lo]. To change the setting, depress the [-] key to set the Weld Tester to the [Lo] range, or depress the [+] key to set the Weld Tester to the [Hi] range.



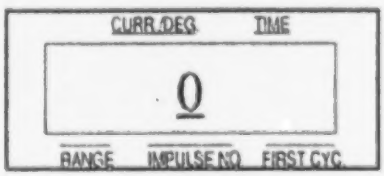


Impulse Number

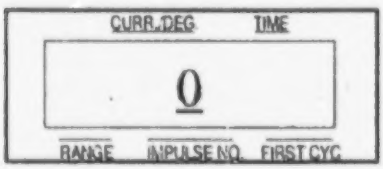
The IMPULSE switch is used to set the Weld Tester to the welder impulse being measured. Refer to the weld schedule, for the weld unit being tested to determine the number of the impulse to be measured. Once the welder impulse is determined, set the Weld Tester to the specified impulse to be measured. The weld tester allows the user to select either all the impulses from the welder (measuring all the impulses present), or the Weld Tester can be set to measure individual welder impulses (from 1-9 impulses). A Weld Tester impulse setting of a number between 1 and 9 indicates that the weld tester will only measure that individual number of impulse from the welder being measured. For example: if the welder produces 9 impulses and the Weld Tester impulse number is set to zero, then all nine impulses will be measured. However, if the Weld Tester impulse number is set to 4, then the Weld Tester will measure only welder impulse number 4, and it will ignore all other impulses.

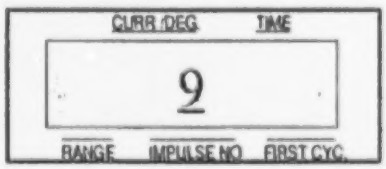
Impulse Number Setting

To determine the Weld Tester impulse number setting, depress the IMPULSE NO. switch once. The center of the LCD display will read a number between 0 and 9 [0,1,2,3,4,5,6,7,8,9]. The underlined number identifies the setting as being a changeable setting. A display of zero[0] identifies the Weld Tester as being set to measure all the impulses from the welder being tested. A display of a number from 1 to 9 [1,2,3,4,5,6,7,8,9] identifies the Weld Tester as being set to measure that specific impulse from the welder being tested. If the impulse number setting is incorrect, then change the impulse number setting.



To change the Impulse Number, depress the IMPULSE NO. switch once. The center of the LCD display will read a number from 0 to 9 [0,1,2,3,4,5,6,7,8,9].





Zero is the lowest setting, and 9 is the highest setting. The underlined number identifies the setting as being a changeable setting. To change the setting, depress the [-] key to lower the impulse number setting, or depress the [+] key to set the Weld Tester to a higher impulse number setting.

First Cycle

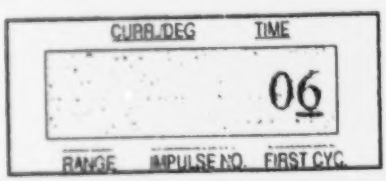
The FIRST CYC. switch is used to set the Weld Tester to the welder first cycle being measured. Refer to the welder being tested to determine the welder cycle specification. Set the Weld Tester to the first cycle to be measured. If the welder produces a single cycle in the schedule of welds, then the Weld Tester

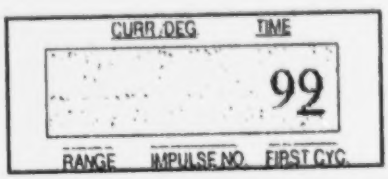
should be set to 1 for the first cycle to be measured. If the welder schedule includes multiple cycle, then the Weld Tester should be set to the first cycle to be measured.

If the weld schedule for a particular welder includes an up-slope, then the Weld Tester should be set to the first actual weld cycle on the schedule, not necessarily the beginning of the weld cycle. For example: if a weld schedule consists of 10 cycles, with the first five cycles dedicated to an up-slope, and the last five cycles dedicated as weld cycles, then the first cycle should be set on the Weld Tester to cycle #6. The number 6 setting would allow the Weld Tester to measure the actual first cycle of the weld schedule. If the first cycle was set to [1] in this case, then the reading would begin on the 1st cycle of the schedule, which would result in the up-slope current measurement being averaged into the full current weld schedule. An up-slope weld current is less than full current weld. This would cause the resulting average current to be lower than the actual current reading for the schedule. By by-passing the up-slope cycles, a truer average current reading can be obtained with the Weld Tester.

First Cycle Setting

To determine the Weld Tester First Cycle number setting, depress the FIRST CYC. switch once. The right of the LCD display will read a number between 1 and 99. The underlined number identifies the setting as being a changeable setting. A display of one[1] identifies the Weld Tester as being set to measure the first cycle in the weld schedule. A display of a number from 1 to 99 identifies the Weld Tester as being set to measure from that specific first cycle from the welder being tested. If the first cycle number setting is incorrect, then change the first cycle setting.





To change the First Cycle setting, depress the FIRST CYC.. switch once. The right of the LCD display will read a number from 1 to 99. One [1] is the lowest setting, and 99 is the highest setting. The underlined number identifies the setting as being a changeable setting. To change the setting, depress the [-] key to lower the first cycle number setting, or depress the [+] key to set the Weld Tester to a higher first cycle number setting.